

Remarks

Reconsideration and allowance of this application, as amended, are respectfully requested.

Claim 1 has been amended. New claims 16 and 17 have been added. Claims 1-17 are now pending in the application. Claims 1 and 16 are independent. The rejections are respectfully submitted to be obviated in view of the amendments and remarks presented herein. No new matter has been introduced through the foregoing amendments.

Claim 1 has been amended to emphasize that the component is "made of a composite material consisting of at least one cover layer and a construction core having a plurality of cavities" and that a test area is wetted "with a *film* of a foam-forming testing liquid." Instant claim 1 thus defines a method in which the component to be tested is made of a composite material consisting of at least one cover layer and a construction core having a plurality of cavities (see disclosure in connection with Figures 3a and 3b at specification page 12).

Furthermore, the step of wetting the component test area has been defined in claim 1 to include applying a *film* of a foam-forming testing liquid (see specification page 13, last line). Although it is believed that the phrase "wetting" already implies applying a film of liquid, as distinguished from prior art methods in which the test component is fully submerged in a water basin or

the like, instant claim 1 now even more clearly reflects the aforementioned difference.

New claims 16 and 17 have been added to further define the scope of protection sought for Applicants' invention.

35 U.S.C. § 103(a) - Disclosed Art and Hirota '965

Claims 1-4 and 6-8 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over "the Applicant's Admission of Prior Art" in view of U.S. Patent No. 3,664,965 to Hirota et al (hereinafter "Hirota '965").

The rejection of claims 1-4 and 6-8 under § 103(a) based on disclosed art and Hirota '965 is respectfully deemed to be obviated. For at least the following reasons, the combined disclosures of the disclosed art and Hirota '965 would not have rendered obvious Applicants' presently claimed invention.

The combined disclosures of the disclosed art and Hirota '965 do not teach all of Applicants' claim features. Instant claim 1 defines a method of leak-testing a component made of a composite material consisting of at least one cover layer and a construction core having a plurality of cavities. For example, two cover layers 5, 6 made of an impregnated carbon fiber fabric are arranged on either side of a lightweight core 4 having a number of hollow chambers 7.

The cited references fail to disclose a method for leak-testing composite materials enclosing a plurality of hollow

chambers. In any case, known leak tests not only suffer from a number of drawbacks, but could not even be applied to the instant class of materials. In particular, prior art methods, in which the test component is immersed in a liquid-filled basin, usually require the component to be submerged for a sufficiently long period in order to allow for a reliable detection of flaws. However, certain regulations limit the immersion time period for composite materials to a mere 30 seconds, so that immersion methods cannot be successfully applied to the class of materials targeted by the present invention.

The present method, on the other hand, is particularly well suited for delicate composite materials, as only a thin film of foam forming liquid is applied to the test component. This is entirely different from the immersion techniques known in the prior art. The immersion techniques are not only restricted by regulations, but also require cumbersome and time consuming drying of the component after the leakage test.

On the other hand, the present invention simply relies on *wetting the test area with a film of testing liquid*, thereby causing little strain on the component and preventing or at least largely reducing moisture from being soaked into the cavities.

Other known leakage tests, as shown for example in CA 2 148 844 A and Hirota '965, rely on subjecting a cavity to a change in pressure, whereupon leaks can be detected from bubbles emerging from a film that has been applied to the surface of the test

component. However, neither of the aforementioned documents provides any incentive for heating the test area in order to cause bubble formation, as is a claim requirement for the present invention.

Heating of a test component is only indirectly shown for prior art immersion methods by heating the liquid of the liquid-filled basin *instead of the component itself*. However, such immersion methods are completely different from the present method, as indicated above.

On the other hand, the present invention makes use of a film of foam forming testing liquid applied to the test area, whereupon *the component* - rather than the thin film of testing liquid - *is subjected to a temperature increase*.

Furthermore, there is simply no teaching in the disclosed art and Hirota '965 that would have led one to select the references and combine them, let alone in a way that would produce the invention defined by Applicants' claim 1.

Accordingly, the combined disclosures of the disclosed art and Hirota '965 would not have rendered obvious the invention defined by claim 1. Claims 2-4 and 6-8 are allowable because they depend, either directly or indirectly, from claim 1, and for the subject matter recited therein.

35 U.S.C. § 103(a) – Tetsuo and Hirota '965

Claims 1, 4, and 6-10 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over JP 57054832 to Tetsuo in view of Hirota '965.

The rejection of claims 1, 4, and 6-10 under § 103(a) based on Tetsuo and Hirota '965 is respectfully deemed to be obviated. For at least the following reasons, the combined disclosures of Tetsuo and Hirota '965 would not have rendered obvious Applicants' presently claimed invention.

Tetsuo merely discloses another immersion method. A liquid contained in a liquid basin is heated in order to increase the temperature of a test piece. Gas sealed in the test piece expands, whereupon the gas leaks through defective points of the test piece. Besides not being feasible for composite materials, as has been outlined above, these prior art immersion methods suffer from various drawbacks. In particular, methods involving the immersion of the test component in a liquid-filled basin require a complex handling with large components. Furthermore, providing for a water basin, and especially heating the water bath, is energy consuming and thus costly.

Since Tetsuo concerns a fundamentally different technique, namely immersing a test component in a liquid-filled basin, as opposed to Applicants' claimed wetting of a composite material with a film of testing liquid and checking for the

formation of bubbles, the combined teachings of Tetsuo and Hirota '965 would not have led one to the present invention.

Accordingly, the combined disclosures of Tetsuo and Hirota '965 would not have rendered obvious the invention defined by claim 1. Claims 4 and 6-10 are allowable because they depend, either directly or indirectly, from claim 1, and for the subject matter recited therein.

35 U.S.C. § 103(a)

Since Tetsuo is the primary reference in each of the other rejections under § 103(a) -- claims 5 and 14 as being unpatentable over Tetsuo in view of Hirota '965 and further in view of U.S. Patent No. 4,553,453 to Goldfarb et al. ("Goldfarb"), and claims 11-13 and 15 as being unpatentable over Tetsuo in view of Hirota '965 and further in view of U.S. Patent No. 4,113,673 to Hirota et al. ("Hirota '673") -- each of these rejections is also respectfully traversed. The combined disclosures of the cited references would not have rendered obvious Applicants' presently claimed invention because the disclosures of Goldfarb and Hirota '673 do not rectify any of the above-described deficiencies of Tetsuo.

Furthermore, there is simply no teaching in any of the references that would have led one to select the references and combine them in a way that would produce the invention defined by any of Applicants' presently pending claims.


Therefore, the various combinations of references would not have rendered obvious the invention defined by Applicants' presently pending claims 5 and 11-15.

New claims 16 and 17 have been added to further define the scope of protection sought for Applicants' invention. New claims 16 and 17 are also allowable. The method defined by claim 16 includes the step of "subjecting the component and a gas that is contained in the cavities to a temperature increase *by irradiating the component.*" Since independent claim 16 includes at least the features discussed above with respect to claim 1, the references neither anticipate nor would have rendered obvious the method defined by claims 16 and 17.

In view of the foregoing, this application is now in condition for allowance. If the examiner believes that an interview might expedite prosecution, the examiner is invited to contact the undersigned.

Respectfully submitted,

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